CLAIMS

1. A cooling system for an electronic display, the system comprising:

a heat dissipater, a compressor, a liquid phase line, and a gas phase line;

a heat collector thermally connected to each of the liquid phase line and the gas line; and

a cover for enclosing the heat collector within a housing of the electronic display.

2. The cooling system of claim 1, further comprising a base thermally coupled to the heat collector, wherein the base is adapted for at least one of thermal connection to an electrical component inside the housing or convective heat transfer from air inside the housing.

3. The cooling system of claim 2, wherein the base comprises:

fins to enhance convective heat transfer from circuitry; and

at least one recess to accommodate the electrical component.

4. The cooling system of claim 1, wherein:

the heat collector is adapted to be enclosed within the housing on an inside of the cover;

the heat dissipator is on an outside of the cover and is not adapted to be enclosed in the housing; and

the liquid phase line and the gas phase line traverse the cover.

5. The cooling system of claim 1, wherein:

the cover is adapted for connection to the housing, for enclosing a circuitry of the electronic display, and for enclosing the heat collector in a housing interior, the cover forming a thermal barrier adapted for placement between a housing interior and a housing exterior; and

the gas phase line and the liquid phase line pass through the cover.

6. The cooling system of claim 1, further comprising:

insulation on an interior surface of the cover;

pins fixed to the heat collector traversing the insulation, and extending through the cover; and

fasteners extending through the cover and the heat collector, the fasteners adapted for engaging the display to fix the cover on the display.

7. The cooling system of claim 6, wherein;

the pins have a position indication mechanism;

the insulation has resilient properties;

the fasteners are threaded fasteners;

the fasteners draw the cover closer to the heat collector and compress the insulation when the fasteners are tightened; and

the position indication mechanism indicates when the cover is in a fully closed position by a visibly changed physical relationship of the pins relative to other display structure.

8. The cooling system of claim 1, wherein the housing is adapted to form an enclosure together with the cover, the cooling system further comprising insulation adapted for mounting on interior surfaces of the enclosure.

9. The cooling system of claim 8, wherein the insulation is adapted to cover generally all of the interior surfaces except for a surface through which a display screen is viewed.

10. The cooling system of claim 8, wherein the insulation is adapted to cover generally all of the interior surfaces of the enclosure.

11. The cooling system of claim 1, further comprising a first sensor in a downstream end of the liquid phase line.

12. The cooling system of claim 12, further comprising a second sensor in a downstream end of the gas phase line.

13. The cooling system of claim 1, further comprising:

a plurality of liquid phase lines including said liquid phase line and a plurality of gas phase lines including said gas phase line, the liquid phase lines and the gas phase lines adapted for thermal connection to a plurality of electronic displays including said electronic display;

a plurality of heat collectors including said heat collector, the plurality of heat collectors thermally connected to respective ones of the plurality of liquid phase lines and to respective ones of the plurality of gas phase lines; and

a plurality of covers including said cover, the plurality of covers adapted for enclosing respective heat collectors of the plurality of heat collectors within housings including said housing of respective ones of said electronic displays.

wherein the compressor is a common compressor for said plurality of electronic displays and the compressor is connected to the heat collectors by respective ones of the liquid phase lines, and by respective ones of the gas phase lines.

14. The cooling system of claim 13, further comprising a regulator in fluid communication with the compressor and the plurality of liquid phase and gas phase lines, wherein at least the compressor is located remotely relative to the plurality of heat collectors.

15. An electronic display and cooling system, comprising:

a housing holding circuitry;

a heat collector inside the housing;

a gas phase line and a liquid phase line; and

a heat dissipater external to the housing, the heat dissipater thermally connected to the heat collector by the gas phase line and the liquid phase line .

16. The display and system of claim 15, further comprising a base thermally connected to the circuitry and thermally connected to the heat collector.

17. The display and system of claim 16, wherein the base comprises a thermal conductor configured to interface with the circuitry in a predetermined manner, wherein the circuitry is a circuitry of a particular electronic display and the base is configured to fit on the circuitry in a thermally conductive condition.

18. The display and system of claim 17, wherein the base comprises:

fins to enhance convective heat transfer from the circuitry; and

at least one recess to accommodate at least one electrical component of the electronic display.

19. The display and system of claim 15, further comprising:

a cover connected to the housing and enclosing the circuitry and the heat collector in a housing interior, the cover forming a thermal barrier between the housing interior and a housing exterior;

wherein the gas phase line and the liquid phase line traverse the cover.

20. The display and system of claim 19, further comprising:

insulation on an interior surface of the cover;

pins fixed to the heat collector traversing a plane of the insulation, and extending through the cover;

fasteners extending through the cover and the heat collector, the fasteners engaging the electronic display to fix the cover on the electronic display.

21. The display and system of claim 20, wherein;

the pins have a position indication mechanism;

the insulation has resilient properties;

the fasteners are threaded fasteners;

the fasteners draw the cover closer to the heat collector and compress the insulation when the fasteners are tightened; and

the position indication mechanism indicates when the cover is in a fully closed position by a visibly changed physical relationship of the pins to other display structure.

22. The display and system of claim 19, wherein the housing and the cover form an enclosure, the display further comprising insulation on interior surfaces of the enclosure.

23. The display and system of claim 22, wherein the insulation covers generally all of the interior surfaces except for a surface through which a display screen is viewed.

24. The display and system of claim 23, wherein:

the enclosure comprises six generally flat sides; and

the insulation covers five of the six sides.

25. The display and system of claim 22, wherein the insulation covers generally all of the interior surfaces of the enclosure.

26. The display and system of claim 15, further comprising:

at least three chambers in a housing interior; and

a plurality of fan sets in the housing interior, each fan set comprising at least one fan, wherein a first fan set is positioned to circulate air from a second chamber to a first chamber and back to the second chamber, wherein a second fan set is positioned to circulate air from the second chamber to a third chamber and back to the second chamber, and wherein excessive heat in the housing interior is transferred outside of the housing without exposing the circuitry in the housing to dust and moisture from outside the housing.

27. The display and system of claim 26, wherein the at least three chambers and the plurality of fan sets are positioned and controlled to move heat from areas of higher heat concentration to selectively cool overheated locations or to warm overly cool locations.

28. The display and system of claim 26, wherein a display component is wholly inside the display housing, wherein the at least three chambers comprise three chambers, and wherein the display component and at least one circuit board are positioned to at least partially define the first chamber as a front chamber, the second chamber as a center chamber, and the third chamber as a rear chamber.

29. The display and system of claim 28, wherein:

the front chamber comprises a portion of the housing between the housing and the display component;

the center chamber comprises a portion of the housing between the display component and the at least one circuit board; and

the rear chamber comprises a portion of the housing between the at least one circuit board and the housing.

30. The display and system of claim 28, wherein the plurality of backlighting lamps are positioned in the center chamber.

31. The display and system of claim 28, wherein the heat collector is positioned in the rear chamber.

32. The display and system of claim 15, further comprising a first sensor in a downstream end of the liquid phase line.

33. The display and system of claim 32, further comprising a second sensor in a downstream end of the gas phase line.

34. The display and system of claim 15, further comprising:

a plurality of liquid phase lines including said liquid phase line and a plurality of gas phase lines including said gas phase line, the plurality of liquid phase lines and the plurality of gas phase lines thermally connected to a respective plurality of electronic displays including said electronic display;

a plurality of heat collectors including said heat collector, the plurality of heat collectors thermally connected to respective ones of the plurality of liquid phase lines and to respective ones of the plurality of gas phase lines; and

a plurality of covers including said cover, the plurality of covers enclosing respective heat collectors of said plurality of heat collectors within a plurality of housings including said housing, the plurality of housings forming enclosures of respective ones of said electronic displays.

wherein the compressor is a common compressor for said plurality of electronic displays and the compressor is connected to the heat collectors by respective ones of the liquid phase lines, and by respective ones of the gas phase lines.

35. The display and system of claim 34, further comprising a regulator in fluid communication with the compressor and the plurality of liquid phase and gas phase lines, wherein at least the compressor is located remotely relative to the plurality of heat collectors.